CHINA ENERGY ENGINEERING GROUP
GUANGDONG ELECTRIC POWER DESIGN INSTITUTE CO., LTD.

ADB

Integrated Low Carbon Energy Solution of Guangzhou International Finance Park in China

Guo Zixuan, Senior Engineer in Power System Analysis

China Energy Engineering Group

Guangdong Electric Power Design Institute CO., Ltd

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GEDI – Whole Process Engineering Service Leading Provider

- Planning Consultancy
- Survey & Design
- EPC Contracting
- Project Supervision
- Investment

POWER GENERATION

- Coal-Fired (25-1000MW)
- Nuclear (1000-1750MW)
- Oil/Gas (40-660MW)
- Renewable Power (Hydraulic, Wind, Biomass, Solar, Geothermal)

POWER TRANSIMISSION & DISTRIBUTION

(AC 110kV~1000kV,DC ±500kV~ ±1100kV)

- Power System Planning
- Transmission and Distribution systems
- Substations
- Distribution Network Control

BUILDING & INFRASTRUCTURE

- Commercial Building and Public works
- Environment (FGD, DE-NOX Plant, CO_2 Capture, Waste Water)
- Infrastructure (Jetty, Seawater Desalination, Water Treatment, Road & Tunnel)
- IT, Communication And automation

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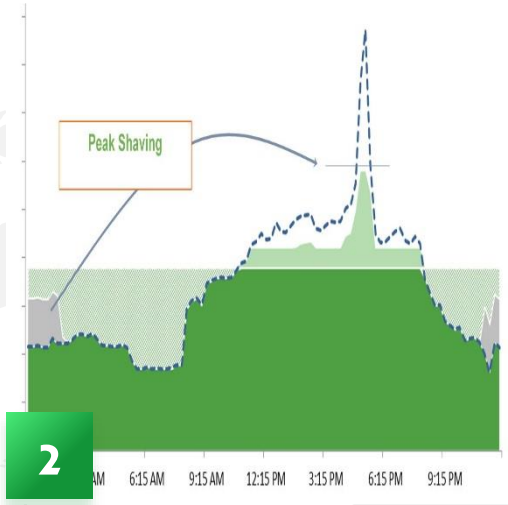
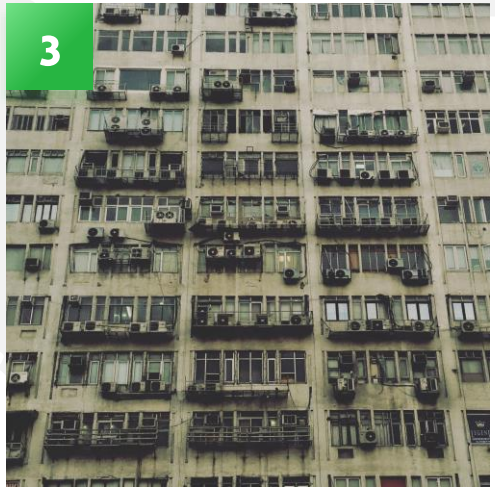
City Centre and High-Tech Industrial Park is Facing Several Low-Carbon Power Supplying Challenge





01. High Pressure of Power Substation

High-Density Load Cause Big Operation Pressure On Power Substations.

02. Short Duration of Cooling Peak Load

Abundant Investment on Power System to meet Short-time Peak Load

03. Demand of Urban Landscape

Land Resource is strictly Limited to prevent from influencing the landscape.

04. Low Efficiency of Distributed Cooling System

The COP of Distributed Cooling System is low, Which is a big Potential to improve the energy efficiency.

Introduction on Guangzhou International Finance Park

Location:
Guangzhou (3rd Largest City In China)

Total Area: 2.3 km²

Total Floorage: 3.95 km²

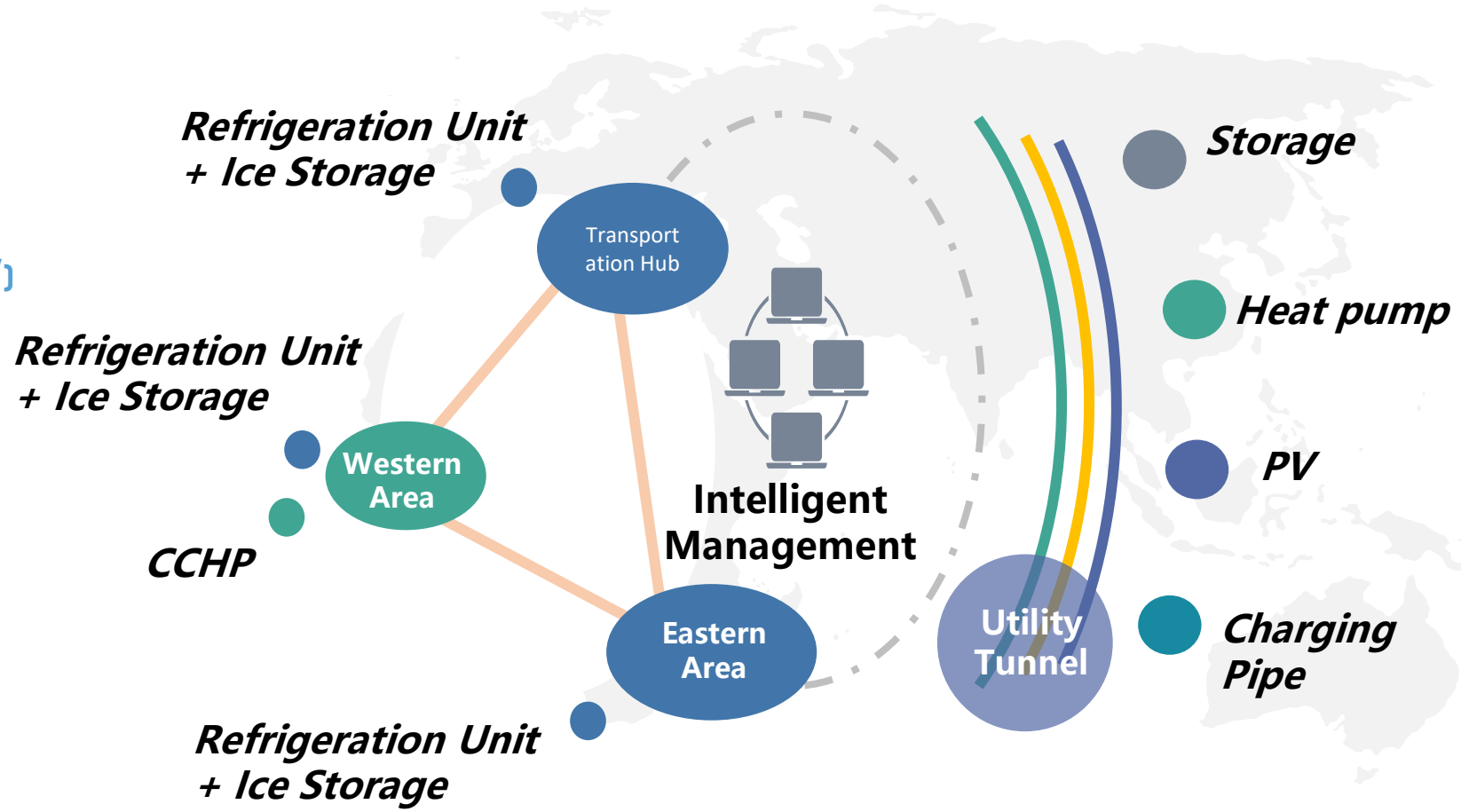
- Concentrated Cooling System
- PV System
- Ice Storage
- CCHP

GEDI Proposed a low Carbon Solution on the Finance Park.

- **Phase 1:**
  - Cooling Station on Transportation Hub(11MW)
  - Eastern Cooling Station(110MW)
  - Cooling Pipe Network
- **Phase 2:**

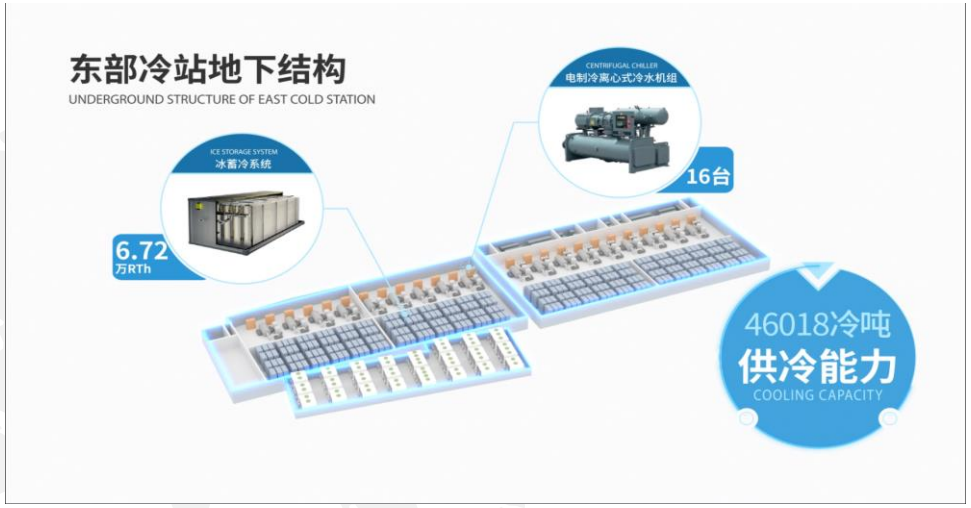
  Western Distributed Energy Station(13MW)
- **Phase 3:**

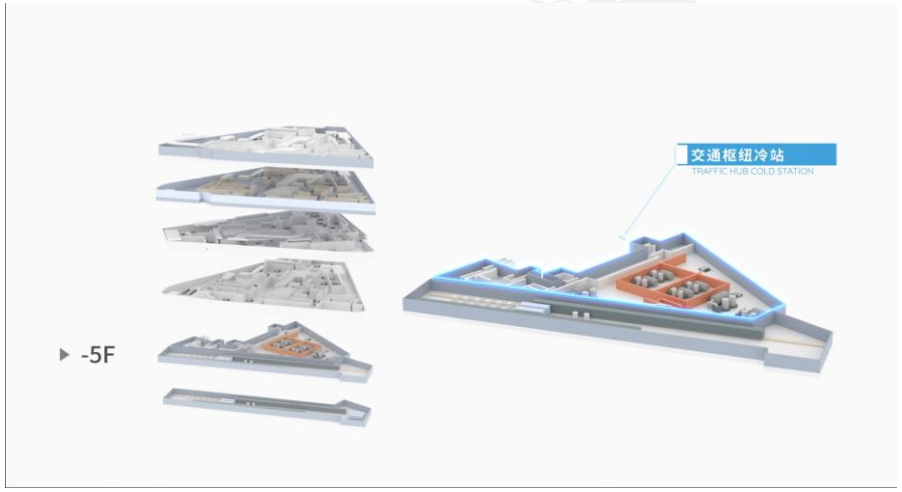
  Scaling up of Eastern Cooling Station



The Cooling Station Adopted an Underground Construction Structure to Maintain the Urban Landscape.

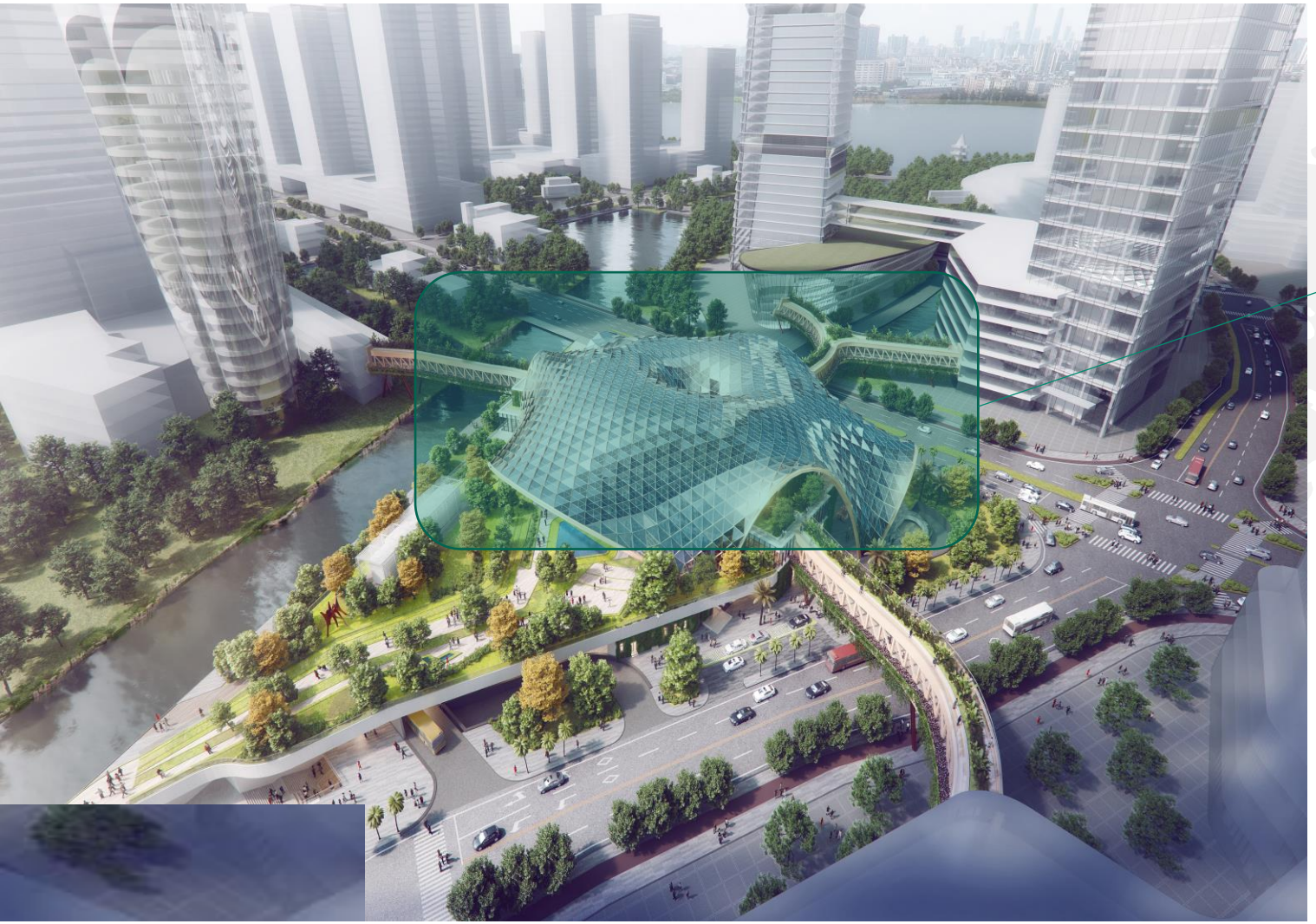
Transportation Hub





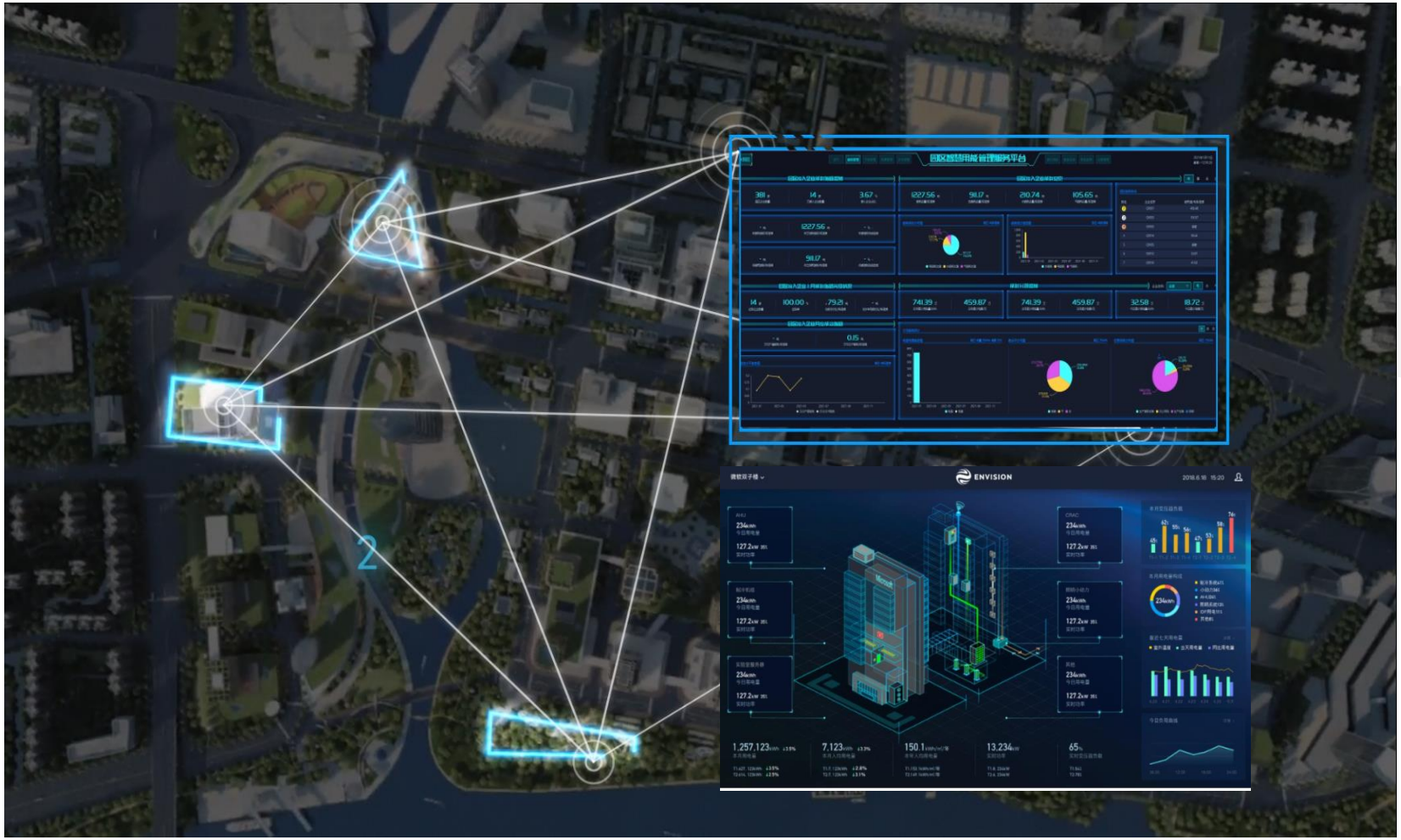
Eastern Area

BIPV (Building Integrated PV) Will be Proposed to Fit the Character of the Landmark Architecture.



Building Integrated PV

Intelligent Energy Management will be applied in the System To Realize Various Optimized Function to Raise the Energy Efficiency.



- Device Status Monitoring
- Real-Time Energy Cost Monitoring
- Energy Utilization Statistics and Analysis
- Energy Saving Potential Analysis
- Operation Optimization Controlling

The Low Carbon Integrated Energy System will effectively optimize the operation of Power System and brings Significant Economical Performance.

Electricity Reduction

Annual Electricity Cost Will be Reduced by **3200** MWh

Coal Reduction

Coal Utilization will reduce by **7390t** In a 2 km2 area.

CO_2 Reduction

Coal Utilization will reduce by **19900t** In a 2 km2 area.

Economical Effective

The total investment will be about 170 million dollar and will get a **rate of return** of **14%** on the investment.

Findings

- Facing the challenge of low carbon development in urban area, **high pressure of substations**, **short-time peak cooling load**, **protection of urban landscape**, and **improvement of cooling device efficiency** are the **main focus points.**
- In a high-tech industrial where the cooling load is concentrated, GEDI proposed an **integrated intelligent energy system** including **Concentrated Cooling System, Ice Storage, PV, CCHP, Battery Storage**. An intelligent energy management system will be applied to coordinate each unit to reach high efficiency.
- The system will adopt the **underground cooling**, **BIPV technology** to maintain the urban landscape, which will also solve the problem of land resource limitation.
- Integrated intelligent energy system will perform a great low carbon and economic effect, in the operation life cycle the system will receive a rate of return of **14%.**

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Thanks.

To make energy more efficient, environment more beautiful.

Zixuan Guo, Senior Engineer of Power System

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